Table 4

	β Blocker	No β Blocker	p Value
Peak HR	148 (12)	175 (16)	0.0008
Peak SBP	190 (21)	188 (15)	0.740
Total exercise time	10.17 (2.03)	10.13 (2.5)	0.940

Effects of wearing an anti-pollution sports air filter mask on pulmonary function and free radical formation during submaximal exercise

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Aim—To investigate the effects of wearing an anti-pollution sports air-filter mask on pulmonary function and free radical formation.
Method—On two occasions, nine male volunteers (mean (SD) age 21.6 (1.2) years, $\dot{V}o_2max$ 48.6 (8.4) $ml.kg^{-1}.min^{-1}$) performed an outdoor one hour bout of submaximal exercise on a stationary cycle ergometer at 60% of their aerobic capacity. The two experiments were completed in random order: without a mask (EXP1) and while wearing a mask (EXP2). Data were collected before (PRE) and after (POST) the acute exercise bouts. Spirometric measurements included vital capacity (VC), forced vital capacity (FVC), and forced expiratory volume (FEV), amongst others. Biochemical parameters of performance included haemoglobin (Hb), haematocrit (Hct), and serum lactate (Lct). Indices of free radical formation comprised blood reduced glutathione (GSH), plasma lipid peroxidation (LP), and nitric oxide (NO) concentrations.
Results—During EXP1, POST values for FVC decreased (p=0.103) while FEV_1, expressed as a ratio of VC and FVC, significantly increased (p= 0.02). There were no differences in concentrations of Hb, Hct, and serum Lct between the two experiments. PRE values of LP ranged from 0.10 to 0.11 $nmol.ml^{-1}$, and significantly increased during the experiment without a mask (+26%, p=0.022). No significant changes in blood GSH were observed between EXP1 and EXP2, but POST concentrations of plasma NO were significantly less attenuated ($p \leq 0.063$) when wearing a mask.
Conclusion—The main findings of the study are: (1) at the pollution level encountered, wearing a mask neither increased nor decreased biochemical and most spirometric parameters of performance, (2) the apparent positive effect of the mask on FVC was not reflected in other spirometric parameters, (3) wearing a sports mask exerts beneficial effects on LP and NO concentrations. At the present level of knowledge it is unclear whether the long term effects of wearing a sports mask have a physiological effect on health.

Effect of β blockers on exercise testing in patients attending phase 3 cardiac rehabilitation after a myocardial infarction: a pilot study

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β Blockers are thought to be of value in secondary prevention up to one year after a myocardial infarction (MI). However, they have a detrimental effect on aerobic exercise performance.

Seven patients exercised using the Bruce protocol in an open study of the effect of atenolol 25 mg. The drug was discontinued and a repeat exercise test performed after one week. Peak heart rate (HR), peak systolic blood pressure (SBP), total exercise test time, reversible ischaemia (ST segment depression ≥1 mm), and limiting symptoms were recorded. Results shown in table 4 are expressed as a means (SD) and compared using paired *t* tests.

All patients were limited by breathlessness but not angina in both exercise tests. Five patients had reduced exercise capacity while taking β blockers. Two patients had evidence of significant ST segment depression during exercise and had improved exercise capacity while taking β blockers. Therefore β blockers may have a detrimental effect on total exercise capacity in patients who have no evidence of reversible ischaemia.

Effects of an enhanced physical education curriculum on physical fitness and body composition in secondary school children

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Daily physical education (PE) was introduced in 1981 to all primary schools in one of the areas of Renfrewshire and continued as enhanced PE in their secondary curriculum, with additional daily, after school, sports activities. The effect of this programme was measured in 119 14–15 year old pupils (47 female, 72 male) and compared within sexes with 139 age matched controls (63 female, 76 male) from a neighbouring school. Physical fitness was measured using the Eurofit test protocol[1] and percentage body fat by calliper skinfold measurements. Table 5 shows the means (SD) of the girls and boys of each school and the results of unpaired *t* tests.

Table 5

Eurofit test	Parameter		Enhanced PE	Control	p Value
Standing broad jump	Explosive	(F)	1.46 (0.24)	1.51 (0.24)	0.26
		(M)	1.75 (0.26)	1.79 (0.20)	0.34
Sit and reach	Flexibility	(F)	23.9 (7.8)	24 (6.83)	0.96
		(M)	17.7 (5.8)	17.4 (7.0)	0.81
Sit ups	Muscle endurance	(F)	21.5 (4.1)	20.0 (2.9)	0.05
		(M)	25.2 (3.1)	25.6 (3.3)	0.46
Leger test	Aerobic endurance	(F)	46.5 (14.7)	43.0 (15.4)	0.29
		(M)	69.6 (22.2)	79.1 (18.7)	0.01
Skinfold measurments	Percentage body fat	(F)	28.5 (3.8)	30.4 (4.5)	0.03
		(M)	18.5 (6.0)	12.7 (4.9)	0.001

Enhanced PE was shown to be associated with reduced levels of percentage body fat in girls, but no significant improvement in other measurements of physical fitness. The higher aerobic endurance and lower percentage body fat in the boys control group may be related to the age group studied as the natural decline in physical activity in teenage years may not yet be apparent, resulting in maintained levels of physical fitness.

1 Council of Europe, Committee for the Development for Sport. *Eurofit: Handbook for the Eurofit tests of physical fitness*. Rome, 1988.

Effect of arm position on the ability to resist external chest compression and its subsequent effects on ventilation

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The Hillsborough disaster in 1989 resulted in 95 people dying of crush asphyxia. Anecdotal stories suggested that arm position during the crush may have affected survival. Little research has been done in this area. Sixteen healthy male volunteers aged between 20 and 40 years, with mean body mass index (BMI) of 23±2, and resting vital capacity (VC) of 5.6±0.8 were studied in this crossover intervention study, with Nottingham University Medical School ethical committee approval. External pressure was applied to the chest using the abdominal portion of the pneumatic anti-shock garment (PASG), which was inflated by increments of 10 mm Hg. The VC and rate of perceived exertion (RPE) were recorded for each of two arm positions (to chest or overhead). The VC with the arms to chest was greater than VC with the arms overhead, p<0.005 using unbalanced repeated measures ANOVA. RPE increased linearly with increasing pressure, with the only statistically significant difference at 10 mm Hg (p<0.05). It is suggested that mechanical hindrance of respiration alters compliance and increases the work of breathing. Further research and video analysis of crush incidents is needed before implications can be made on crowd safety.

Effect of arm position on the ability to withstand restriction of vital capacity by an external compressive force

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Anecdotal evidence from crowd incidents suggests that holding the arms above the head is associated with a decreased chance of surviving the incident.
Aim—To test the hypothesis that holding the arms to the chest limits the restriction of vital capacity (VC) by an external compressive force.
Method—We studied 16 normal volunteers using an anti-shock garment to compress the thorax. Subjects were studied with their arms across the front of their chest inside the garment ("chest"), or with their arms on their head ("head"), in random order. VC was measured using a mouthpiece attached to a pneumotachograph and analogue integrator. The pressure in the garment was increased in increments of 10 mm Hg at intervals of five minutes until either the subject could not tolerate the pressure or VC had fallen by 50%.
Results—Table 6 shows the mean VCs for the 16 subjects. VC with the arms to the chest